SEQUENCE LISTING

<110> Pecker, Iris

Vlodavsky , Israel

Feinstein, Elena

<120> POLYNUCLEOTIDE ENCODING A POLYPEPTIDE HAVING HEPARANASE ACTIVITY AND EXPRESSION OF SAME IN GENETICALLY MODIFIED CELLS

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<170> PatentIn version 3.1

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        35                  40                  45

Leu His Leu Val Ser Pro Ser Phe Leu Ser Val Thr Ile Asp Ala Asn
    50                  55                  60

Leu Ala Thr Asp Pro Arg Phe Leu Ile Leu Leu Gly Ser Pro Lys Leu
65                  70                  75                  80

Arg Thr Leu Ala Arg Gly Leu Ser Pro Ala Tyr Leu Arg Phe Gly Gly
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Thr Lys Thr Asp Phe Leu Ile Phe Asp Pro Lys Lys Glu Ser Thr Phe
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Glu Glu Arg Ser Tyr Trp Gln Ser Gln Val Asn Gln Asp Ile Cys Lys
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Tyr Gly Ser Ile Pro Pro Asp Val Glu Glu Lys Leu Arg Leu Glu Trp
    130                 135                 140

Pro Tyr Gln Glu Gln Leu Leu Leu Arg Glu His Tyr Gln Lys Lys Phe
145                 150                 155                 160

Lys Asn Ser Thr Tyr Ser Arg Ser Ser Val Asp Val Leu Tyr Thr Phe
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Arg Thr Ala Asp Leu Gln Trp Asn Ser Ser Asn Ala Gln Leu Leu Leu
        195                 200                 205

Asp Tyr Cys Ser Ser Lys Gly Tyr Asn Ile Ser Trp Glu Leu Gly Asn
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Glu Pro Asn Ser Phe Leu Lys Lys Ala Asp Ile Phe Ile Asn Gly Ser
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Gln Leu Gly Glu Asp Tyr Ile Gln Leu His Lys Leu Leu Arg Lys Ser
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Ser Ser Val Gln Lys Val Phe Gln Val Val Glu Ser Thr Arg Pro Gly
                325                 330                 335

Lys Lys Val Trp Leu Gly Glu Thr Ser Ser Ala Tyr Gly Gly Gly Ala
            340                 345                 350

Pro Leu Leu Ser Asp Thr Phe Ala Ala Gly Phe Met Trp Leu Asp Lys
        355                 360                 365

Leu Gly Leu Ser Ala Arg Met Gly Ile Glu Val Val Met Arg Gln Val
    370                 375                 380

Phe Phe Gly Ala Gly Asn Tyr His Leu Val Asp Glu Asn Phe Asp Pro
385                 390                 395                 400

Leu Pro Asp Tyr Trp Leu Ser Leu Leu Phe Lys Lys Leu Val Gly Thr
                405                 410                 415

Lys Val Leu Met Ala Ser Val Gln Gly Ser Lys Arg Arg Lys Leu Arg
            420                 425                 430

Val Tyr Leu His Cys Thr Asn Thr Asp Asn Pro Arg Tyr Lys Glu Gly
        435                 440                 445

Asp Leu Thr Leu Tyr Ala Ile Asn Leu His Asn Val Thr Lys Tyr Leu
    450                 455                 460

Arg Leu Pro Tyr Pro Phe Ser Asn Lys Gln Val Asp Lys Tyr Leu Leu
465                 470                 475                 480

Arg Pro Leu Gly Pro His Gly Leu Leu Ser Lys Ser Val Gln Leu Asn
                485                 490                 495

Gly Leu Thr Leu Lys Met Val Asp Asp Gln Thr Leu Pro Pro Leu Met
            500                 505                 510

Glu Lys Pro Leu Arg Pro Gly Ser Ser Leu Gly Leu Pro Ala Phe Ser
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   Met Leu Leu Arg Ser Lys Pro Ala Leu Pro Pro Pro Leu Met Leu
   1               5                  10                  15

ctg ctc ctg ggg ccg ctg ggt ccc ctc tcc cct ggc gcc ctg ccc cga        155
Leu Leu Leu Gly Pro Leu Gly Pro Leu Ser Pro Gly Ala Leu Pro Arg
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cct gcg caa gca cag gac gtc gtg gac ctg gac ttc ttc acc cag gag        203
Pro Ala Gln Ala Gln Asp Val Val Asp Leu Asp Phe Phe Thr Gln Glu
            35                  40                  45

ccg ctg cac ctg gtg agc ccc tcg ttc ctg tcc gtc acc att gac gcc        251
Pro Leu His Leu Val Ser Pro Ser Phe Leu Ser Val Thr Ile Asp Ala
        50                  55                  60

aac ctg gcc acg gac ccg cgg ttc ctc atc ctc ctg ggt tct cca aag        299
Asn Leu Ala Thr Asp Pro Arg Phe Leu Ile Leu Leu Gly Ser Pro Lys
    65                  70                  75

ctt cgt acc ttg gcc aga ggc ttg tct cct gcg tac ctg agg ttt ggt        347
Leu Arg Thr Leu Ala Arg Gly Leu Ser Pro Ala Tyr Leu Arg Phe Gly
80                  85                  90                  95

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Gly Thr Lys Thr Asp Phe Leu Ile Phe Asp Pro Lys Lys Glu Ser Thr
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ttt gaa gag aga agt tac tgg caa tct caa gtc aac cag gat att tgc        443
Phe Glu Glu Arg Ser Tyr Trp Gln Ser Gln Val Asn Gln Asp Ile Cys
            115                 120                 125

aaa tat gga tcc atc cct cct gat gtg gag gag aag tta cgg ttg gaa        491
Lys Tyr Gly Ser Ile Pro Pro Asp Val Glu Glu Lys Leu Arg Leu Glu
        130                 135                 140

tgg ccc tac cag gag caa ttg cta ctc cga gaa cac tac cag aaa aag        539
Trp Pro Tyr Gln Glu Gln Leu Leu Leu Arg Glu His Tyr Gln Lys Lys
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Phe Lys Asn Ser Thr Tyr Ser Arg Ser Ser Val Asp Val Leu Tyr Thr
160                 165                 170                 175

ttt gca aac tgc tca gga ctg gac ttg atc ttt ggc cta aat gcg tta        635
Phe Ala Asn Cys Ser Gly Leu Asp Leu Ile Phe Gly Leu Asn Ala Leu
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Leu Asp Tyr Cys Ser Ser Lys Gly Tyr Asn Ile Ser Trp Glu Leu Gly
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Asn Glu Pro Asn Ser Phe Leu Lys Lys Ala Asp Ile Phe Ile Asn Gly
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tcc acc ttc aaa aat gca aaa ctc tat ggt cct gat gtt ggt cag cct      875
Ser Thr Phe Lys Asn Ala Lys Leu Tyr Gly Pro Asp Val Gly Gln Pro
                260                 265                 270

cga aga aag acg gct aag atg ctg aag agc ttc ctg aag gct ggt gga      923
Arg Arg Lys Thr Ala Lys Met Leu Lys Ser Phe Leu Lys Ala Gly Gly
            275                 280                 285

gaa gtg att gat tca gtt aca tgg cat cac tac tat ttg aat gga cgg      971
Glu Val Ile Asp Ser Val Thr Trp His His Tyr Tyr Leu Asn Gly Arg
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Thr Ala Thr Arg Glu Asp Phe Leu Asn Pro Asp Val Leu Asp Ile Phe
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att tca tct gtg caa aaa gtt ttc cag gtg gtt gag agc acc agg cct     1067
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gcg ccc ttg cta tcc gac acc ttt gca gct ggc ttt atg tgg ctg gat     1163
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aaa ttg ggc ctg tca gcc cga atg gga ata gaa gtg gtg atg agg caa     1211
Lys Leu Gly Leu Ser Ala Arg Met Gly Ile Glu Val Val Met Arg Gln
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Val Phe Phe Gly Ala Gly Asn Tyr His Leu Val Asp Glu Asn Phe Asp
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cct tta cct gat tat tgg cta tct ctt ctg ttc aag aaa ttg gtg ggc     1307
Pro Leu Pro Asp Tyr Trp Leu Ser Leu Leu Phe Lys Lys Leu Val Gly
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acc aag gtg tta atg gca agc gtg caa ggt tca aag aga agg aag ctt     1355
Thr Lys Val Leu Met Ala Ser Val Gln Gly Ser Lys Arg Arg Lys Leu
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Arg Val Tyr Leu His Cys Thr Asn Thr Asp Asn Pro Arg Tyr Lys Glu
            435                 440                 445

gga gat tta act ctg tat gcc ata aac ctc cat aac gtc acc aag tac     1451
Gly Asp Leu Thr Leu Tyr Ala Ile Asn Leu His Asn Val Thr Lys Tyr
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Leu Arg Pro Leu Gly Pro His Gly Leu Leu Ser Lys Ser Val Gln Leu
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atg gaa aaa cct ctc cgg cca gga agt tca ctg ggc ttg cca gct ttc     1643
Met Glu Lys Pro Leu Arg Pro Gly Ser Ser Leu Gly Leu Pro Ala Phe
            515                 520                 525

tca tat agt ttt ttt gtg ata aga aat gcc aaa gtt gct gct tgc atc     1691
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<213> Homo sapiens

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Lys Met Leu Leu Arg Ser Lys Pro Ala Leu Pro Pro Pro Leu Met Leu
50 55 60

Leu Leu Leu Gly Pro Leu Gly Pro Leu Ser Pro Gly Ala Leu Pro Arg
65 70 75 80

Pro Ala Gln Ala Gln Asp Val Val Asp Leu Asp Phe Phe Thr Gln Glu
85 90 95

Pro Leu His Leu Val Ser Pro Ser Phe Leu Ser Val Thr Ile Asp Ala
100 105 110

Asn Leu Ala Thr Asp Pro Arg Phe Leu Ile Leu Leu Gly Ser Pro Lys
115 120 125

Leu Arg Thr Leu Ala Arg Gly Leu Ser Pro Ala Tyr Leu Arg Phe Gly
130 135 140

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Lys Tyr Gly Ser Ile Pro Pro Asp Val Glu Glu Lys Leu Arg Leu Glu
            180                 185                 190

Trp Pro Tyr Gln Glu Gln Leu Leu Leu Arg Glu His Tyr Gln Lys Lys
        195                 200                 205

Phe Lys Asn Ser Thr Tyr Ser Arg Ser Ser Val Asp Val Leu Tyr Thr
    210                 215                 220

Phe Ala Asn Cys Ser Gly Leu Asp Leu Ile Phe Gly Leu Asn Ala Leu
225                 230                 235                 240

Leu Arg Thr Ala Asp Leu Gln Trp Asn Ser Ser Asn Ala Gln Leu Leu
                245                 250                 255

Leu Asp Tyr Cys Ser Ser Lys Gly Tyr Asn Ile Ser Trp Glu Leu Gly
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Asn Glu Pro Asn Ser Phe Leu Lys Lys Ala Asp Ile Phe Ile Asn Gly
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Ser Gln Leu Gly Glu Asp Tyr Ile Gln Leu His Lys Leu Leu Arg Lys
    290                 295                 300

Ser Thr Phe Lys Asn Ala Lys Leu Tyr Gly Pro Asp Val Gly Gln Pro
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Arg Arg Lys Thr Ala Lys Met Leu Lys Ser Phe Leu Lys Ala Gly Gly
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Glu Val Ile Asp Ser Val Thr Trp His His Tyr Tyr Leu Asn Gly Arg
            340                 345                 350

Thr Ala Thr Arg Glu Asp Phe Leu Asn Pro Asp Val Leu Asp Ile Phe
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Ile Ser Ser Val Gln Lys Val Phe Gln Val Val Glu Ser Thr Arg Pro
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Ala Pro Leu Leu Ser Asp Thr Phe Ala Ala Gly Phe Met Trp Leu Asp
                405                 410                 415

Lys Leu Gly Leu Ser Ala Arg Met Gly Ile Glu Val Val Met Arg Gln
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Val Phe Phe Gly Ala Gly Asn Tyr His Leu Val Asp Glu Asn Phe Asp
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Pro Leu Pro Asp Tyr Trp Leu Ser Leu Leu Phe Lys Lys Leu Val Gly
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Thr Lys Val Leu Met Ala Ser Val Gln Gly Ser Lys Arg Arg Lys Leu
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            500                 505                 510

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        515                 520                 525

Leu Arg Pro Leu Gly Pro His Gly Leu Leu Ser Lys Ser Val Gln Leu
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Asn Gly Leu Thr Leu Lys Met Val Asp Asp Gln Thr Leu Pro Pro Leu
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Met Glu Lys Pro Leu Arg Pro Gly Ser Ser Leu Gly Leu Pro Ala Phe
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<222> (94)..(1869)

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                                    Met Glu Gly Ala Val Gly Gly
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gtg agg agg cgt aac ggg gcg gag gaa agg aga aaa ggg cgc tgg ggc      162
Val Arg Arg Arg Asn Gly Ala Glu Glu Arg Arg Lys Gly Arg Trp Gly
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tcg gcg gga gga agt gct aga gct ctc gac tct ccg ctg cgc ggc agc      210
Ser Ala Gly Gly Ser Ala Arg Ala Leu Asp Ser Pro Leu Arg Gly Ser
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tgg cgg ggg gag cag cca ggt gag ccc aag atg ctg ctg cgc tcg aag      258
Trp Arg Gly Glu Gln Pro Gly Glu Pro Lys Met Leu Leu Arg Ser Lys
40                  45                  50                  55

cct gcg ctg ccg ccg ccg ctg atg ctg ctg ctc ctg ggg ccg ctg ggt      306
Pro Ala Leu Pro Pro Pro Leu Met Leu Leu Leu Gly Pro Leu Gly
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ccc ctc tcc cct ggc gcc ctg ccc cga cct gcg caa gca cag gac gtc      354
Pro Leu Ser Pro Gly Ala Leu Pro Arg Pro Ala Gln Ala Gln Asp Val
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gtg gac ctg gac ttc ttc acc cag gag ccg ctg cac ctg gtg agc ccc      402
Val Asp Leu Asp Phe Phe Thr Gln Glu Pro Leu His Leu Val Ser Pro
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Ser Phe Leu Ser Val Thr Ile Asp Ala Asn Leu Ala Thr Asp Pro Arg
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ttc ctc atc ctc ctg ggt tct cca aag ctt cgt acc ttg gcc aga ggc      498
Phe Leu Ile Leu Leu Gly Ser Pro Lys Leu Arg Thr Leu Ala Arg Gly
120                 125                 130                 135

ttg tct cct gcg tac ctg agg ttt ggt ggc acc aag aca gac ttc cta      546
Leu Ser Pro Ala Tyr Leu Arg Phe Gly Gly Thr Lys Thr Asp Phe Leu
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att ttc gat ccc aag aag gaa tca acc ttt gaa gag aga agt tac tgg      594
Ile Phe Asp Pro Lys Lys Glu Ser Thr Phe Glu Glu Arg Ser Tyr Trp
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caa tct caa gtc aac cag gat att tgc aaa tat gga tcc atc cct cct      642
Gln Ser Gln Val Asn Gln Asp Ile Cys Lys Tyr Gly Ser Ile Pro Pro
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gat gtg gag gag aag tta cgg ttg gaa tgg ccc tac cag gag caa ttg      690
Asp Val Glu Glu Lys Leu Arg Leu Glu Trp Pro Tyr Gln Glu Gln Leu
    185                 190                 195

cta ctc cga gaa cac tac cag aaa aag ttc aag aac agc acc tac tca      738
Leu Leu Arg Glu His Tyr Gln Lys Lys Phe Lys Asn Ser Thr Tyr Ser
200                 205                 210                 215

aga agc tct gta gat gtg cta tac act ttt gca aac tgc tca gga ctg      786
Arg Ser Ser Val Asp Val Leu Tyr Thr Phe Ala Asn Cys Ser Gly Leu
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gac ttg atc ttt ggc cta aat gcg tta tta aga aca gca gat ttg cag      834
Asp Leu Ile Phe Gly Leu Asn Ala Leu Leu Arg Thr Ala Asp Leu Gln
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tgg aac agt tct aat gct cag ttg ctc ctg gac tac tgc tct tcc aag      882
Trp Asn Ser Ser Asn Ala Gln Leu Leu Leu Asp Tyr Cys Ser Ser Lys
        250                 255                 260

ggg tat aac att tct tgg gaa cta ggc aat gaa cct aac agt ttc ctt      930
Gly Tyr Asn Ile Ser Trp Glu Leu Gly Asn Glu Pro Asn Ser Phe Leu
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aag aag gct gat att ttc atc aat ggg tcg cag tta gga gaa gat tat      978
Lys Lys Ala Asp Ile Phe Ile Asn Gly Ser Gln Leu Gly Glu Asp Tyr
280                 285                 290                 295

att caa ttg cat aaa ctt cta aga aag tcc acc ttc aaa aat gca aaa     1026
Ile Gln Leu His Lys Leu Leu Arg Lys Ser Thr Phe Lys Asn Ala Lys
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ctc tat ggt cct gat gtt ggt cag cct cga aga aag acg gct aag atg     1074
Leu Tyr Gly Pro Asp Val Gly Gln Pro Arg Arg Lys Thr Ala Lys Met
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ctg aag agc ttc ctg aag gct ggt gga gaa gtg att gat tca gtt aca     1122
Leu Lys Ser Phe Leu Lys Ala Gly Gly Glu Val Ile Asp Ser Val Thr
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tgg cat cac tac tat ttg aat gga cgg act gct acc agg gaa gat ttt     1170
Trp His His Tyr Tyr Leu Asn Gly Arg Thr Ala Thr Arg Glu Asp Phe
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cta aac cct gat gta ttg gac att ttt att tca tct gtg caa aaa gtt     1218
Leu Asn Pro Asp Val Leu Asp Ile Phe Ile Ser Ser Val Gln Lys Val
360                 365                 370                 375

ttc cag gtg gtt gag agc acc agg cct ggc aag aag gtc tgg tta gga     1266
Phe Gln Val Val Glu Ser Thr Arg Pro Gly Lys Lys Val Trp Leu Gly
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gaa aca agc tct gca tat gga ggc gga gcg ccc ttg cta tcc gac acc     1314
Glu Thr Ser Ser Ala Tyr Gly Gly Gly Ala Pro Leu Leu Ser Asp Thr
            395                 400                 405

ttt gca gct ggc ttt atg tgg ctg gat aaa ttg ggc ctg tca gcc cga     1362
Phe Ala Ala Gly Phe Met Trp Leu Asp Lys Leu Gly Leu Ser Ala Arg
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Tyr His Leu Val Asp Glu Asn Phe Asp Pro Leu Pro Asp Tyr Trp Leu
440                 445                 450                 455

tct ctt ctg ttc aag aaa ttg gtg ggc acc aag gtg tta atg gca agc     1506
Ser Leu Leu Phe Lys Lys Leu Val Gly Thr Lys Val Leu Met Ala Ser
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gtg caa ggt tca aag aga agg aag ctt cga gta tac ctt cat tgc aca     1554
Val Gln Gly Ser Lys Arg Arg Lys Leu Arg Val Tyr Leu His Cys Thr
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aac act gac aat cca agg tat aaa gaa gga gat tta act ctg tat gcc     1602
Asn Thr Asp Asn Pro Arg Tyr Lys Glu Gly Asp Leu Thr Leu Tyr Ala
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ata aac ctc cat aac gtc acc aag tac ttg cgg tta ccc tat cct ttt     1650
Ile Asn Leu His Asn Val Thr Lys Tyr Leu Arg Leu Pro Tyr Pro Phe
    505                 510                 515

tct aac aag caa gtg gat aaa tac ctt cta aga cct ttg gga cct cat     1698
Ser Asn Lys Gln Val Asp Lys Tyr Leu Leu Arg Pro Leu Gly Pro His
520                 525                 530                 535

gga tta ctt tcc aaa tct gtc caa ctc aat ggt cta act cta aag atg     1746
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Val Asp Asp Gln Thr Leu Pro Pro Leu Met Glu Lys Pro Leu Arg Pro
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gga agt tca ctg ggc ttg cca gct ttc tca tat agt ttt ttt gtg ata     1842
Gly Ser Ser Leu Gly Leu Pro Ala Phe Ser Tyr Ser Phe Phe Val Ile
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aga aat gcc aaa gtt gct gct tgc atc tgaaaataaa atatactagt           1889
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ccgggcgctt ggatcccggc catctccgca cccttcaagt gggtgtgggt gatttcgtaa    480

gtgaacgtga ccgccaccgg ggggaaagcg agcaaggaag taggagagag ccgggcaggc    540

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Gln Val Asn His Asp Ile Cys Arg Ser Glu Pro Val Ser Ala Ala Val
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Leu Arg Lys Leu Gln Val Glu Trp Pro Phe Gln Glu Leu Leu Leu Leu
    130                 135                 140

Arg Glu Gln Tyr Gln Lys Glu Phe Lys Asn Ser Thr Tyr Ser Arg Ser
145                 150                 155                 160

Ser Val Asp Met Leu Tyr Ser Phe Ala Lys Cys Ser Gly Leu Asp Leu
                165                 170                 175

Ile Phe Gly Leu Asn Ala Leu Leu Arg Thr Pro Asp Leu Arg Trp Asn
            180                 185                 190

Ser Ser Asn Ala Gln Leu Leu Leu Asp Tyr Cys Ser Ser Lys Gly Tyr
        195                 200                 205

Asn Ile Ser Trp Glu Leu Gly Asn Glu Pro Asn Ser Phe Trp Lys Lys
    210                 215                 220

Ala His Ile Leu Ile Asp Gly Leu Gln Leu Gly Glu Asp Phe Val Glu
225                 230                 235                 240

Leu His Lys Leu Leu Gln Arg Ser Ala Phe Gln Asn Ala Lys Leu Tyr
                245                 250                 255

Gly Pro Asp Ile Gly Gln Pro Arg Gly Lys Thr Val Lys Leu Leu Arg
            260                 265                 270
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Ser Phe Leu Lys Ala Gly Gly Glu Val Ile Asp Ser Leu Thr Trp His
        275                 280                 285

His Tyr Tyr Leu Asn Gly Arg Ile Ala Thr Lys Glu Asp Phe Leu Ser
    290                 295                 300

Ser Asp Ala Leu Asp Thr Phe Ile Leu Ser Val Gln Lys Ile Leu Lys
305                 310                 315                 320

Val Thr Lys Glu Ile Thr Pro Gly Lys Lys Val Trp Leu Gly Glu Thr
                325                 330                 335

Ser Ser Ala Tyr Gly Gly Gly Ala Pro Leu Leu Ser Asn Thr Phe Ala
            340                 345                 350

Ala Gly Phe Met Trp Leu Asp Lys Leu Gly Leu Ser Ala Gln Met Gly
        355                 360                 365

Ile Glu Val Val Met Arg Gln Val Phe Phe Gly Ala Gly Asn Tyr His
    370                 375                 380

Leu Val Asp Glu Asn Phe Glu Pro Leu Pro Asp Tyr Trp Leu Ser Leu
385                 390                 395                 400

Leu Phe Lys Lys Leu Val Gly Pro Arg Val Leu Leu Ser Arg Val Lys
                405                 410                 415

Gly Pro Asp Arg Ser Lys Leu Arg Val Tyr Leu His Cys Thr Asn Val
            420                 425                 430

Tyr His Pro Arg Tyr Gln Glu Gly Asp Leu Thr Leu Tyr Val Leu Asn
        435                 440                 445

Leu His Asn Val Thr Lys His Leu Lys Val Pro Pro Pro Leu Phe Arg
    450                 455                 460

Lys Pro Val Asp Thr Tyr Leu Leu Lys Pro Ser Gly Pro Asp Gly Leu
465                 470                 475                 480

Leu Ser Lys Ser Val Gln Leu Asn Gly Gln Ile Leu Lys Met Val Asp
                485                 490                 495

Glu Gln Thr Leu Pro Ala Leu Thr Glu Lys Pro Leu Pro Ala Gly Ser
            500                 505                 510

Ala Leu Ser Leu Pro Ala Phe Ser Tyr Gly Phe Phe Val Ile Arg Asn
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Ala Lys Ile Ala Ala Cys Ile
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<222> (594)..(2198)

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ttaaggcaga agggagtcgg ggtagggtct ggctgaaccc tcaaccgggg cttttaactc     180

agggtctagt cctggcgcca aatggatggg acctagaaaa ggtgacagag tgcgcaggac     240

accaggaagc tggtcccacc cctgcgcggc tcccgggcgc tccctcccca ggcctccgag     300

gatcttggat tctggccacc tccgcaccct ttggatgggt gtggatgatt tcaaaagtgg     360

acgtgaccgc ggcggagggg aaagccagca cggaaatgaa agagagcgag gaggggaggg     420

cggggagggg agggcgctag ggagggactc ccgggagggg tgggagggat ggagcgctgt     480

gggagggtac tgagtcctgg cgccagaggc gaagcaggac cggttgcagg gggcttgagc     540

cagcgcgccg gctgccccag ctctcccggc agcgggcggt ccagccaggt ggg atg         596
                                                              Met
                                                               1

ctg agg ctg ctg ctg ctg tgg ctc tgg ggg ccg ctc ggt gcc ctg gcc      644
Leu Arg Leu Leu Leu Leu Trp Leu Trp Gly Pro Leu Gly Ala Leu Ala
            5                  10                  15

cag ggc gcc ccc gcg ggg acc gcg ccg acc gac gac gtg gta gac ttg      692
Gln Gly Ala Pro Ala Gly Thr Ala Pro Thr Asp Asp Val Val Asp Leu
        20                  25                  30

gag ttt tac acc aag cgg ccg ctc cga agc gtg agt ccc tcg ttc ctg      740
Glu Phe Tyr Thr Lys Arg Pro Leu Arg Ser Val Ser Pro Ser Phe Leu
    35                  40                  45

tcc atc acc atc gac gcc agc ctg gcc acc gac ccg cgc ttc ctc acc      788
Ser Ile Thr Ile Asp Ala Ser Leu Ala Thr Asp Pro Arg Phe Leu Thr
50                  55                  60                  65

ttc ctg ggc tct cca agg ctc cgt gct ctg gct aga ggc tta tct cct      836
Phe Leu Gly Ser Pro Arg Leu Arg Ala Leu Ala Arg Gly Leu Ser Pro
                70                  75                  80

gca tac ttg aga ttt ggc ggc aca aag act gac ttc ctt att ttt gat      884
Ala Tyr Leu Arg Phe Gly Gly Thr Lys Thr Asp Phe Leu Ile Phe Asp
            85                  90                  95

ccg gac aag gaa ccg act tcc gaa gaa aga agt tac tgg aaa tct caa      932
Pro Asp Lys Glu Pro Thr Ser Glu Glu Arg Ser Tyr Trp Lys Ser Gln
        100                 105                 110

gtc aac cat gat att tgc agg tct gag ccg gtc tct gct gcg gtg ttg      980
Val Asn His Asp Ile Cys Arg Ser Glu Pro Val Ser Ala Ala Val Leu
    115                 120                 125

agg aaa ctc cag gtg gaa tgg ccc ttc cag gag ctg ttg ctg ctc cga     1028
Arg Lys Leu Gln Val Glu Trp Pro Phe Gln Glu Leu Leu Leu Leu Arg
130                 135                 140                 145

gag cag tac caa aag gag ttc aag aac agc acc tac tca aga agc tca     1076
Glu Gln Tyr Gln Lys Glu Phe Lys Asn Ser Thr Tyr Ser Arg Ser Ser
                150                 155                 160

gtg gac atg ctc tac agt ttt gcc aag tgc tcg ggg tta gac ctg atc     1124
Val Asp Met Leu Tyr Ser Phe Ala Lys Cys Ser Gly Leu Asp Leu Ile
            165                 170                 175

ttt ggt cta aat gcg tta cta cga acc cca gac tta cgg tgg aac agc     1172
Phe Gly Leu Asn Ala Leu Leu Arg Thr Pro Asp Leu Arg Trp Asn Ser
        180                 185                 190

tcc aac gcc cag ctt ctc ctt gac tac tgc tct tcc aag ggt tat aac     1220
Ser Asn Ala Gln Leu Leu Leu Asp Tyr Cys Ser Ser Lys Gly Tyr Asn
    195                 200                 205
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atc tcc tgg gaa ctg ggc aat gag ccc aac agt ttc tgg aag aaa gct     1268
Ile Ser Trp Glu Leu Gly Asn Glu Pro Asn Ser Phe Trp Lys Lys Ala
210                 215                 220                 225

cac att ctc atc gat ggg ttg cag tta gga gaa gac ttt gtg gag ttg     1316
His Ile Leu Ile Asp Gly Leu Gln Leu Gly Glu Asp Phe Val Glu Leu
                230                 235                 240

cat aaa ctt cta caa agg tca gct ttc caa aat gca aaa ctc tat ggt     1364
His Lys Leu Leu Gln Arg Ser Ala Phe Gln Asn Ala Lys Leu Tyr Gly
            245                 250                 255

cct gac atc ggt cag cct cga ggg aag aca gtt aaa ctg ctg agg agt     1412
Pro Asp Ile Gly Gln Pro Arg Gly Lys Thr Val Lys Leu Leu Arg Ser
        260                 265                 270

ttc ctg aag gct ggc gga gaa gtg atc gac tct ctt aca tgg cat cac     1460
Phe Leu Lys Ala Gly Gly Glu Val Ile Asp Ser Leu Thr Trp His His
    275                 280                 285

tat tac ttg aat gga cgc atc gct acc aaa gaa gat ttt ctg agc tct     1508
Tyr Tyr Leu Asn Gly Arg Ile Ala Thr Lys Glu Asp Phe Leu Ser Ser
290                 295                 300                 305

gat gcg ctg gac act ttt att ctc tct gtg caa aaa att ctg aag gtc     1556
Asp Ala Leu Asp Thr Phe Ile Leu Ser Val Gln Lys Ile Leu Lys Val
                310                 315                 320

act aaa gag atc aca cct ggc aag aag gtc tgg ttg gga gag acg agc     1604
Thr Lys Glu Ile Thr Pro Gly Lys Lys Val Trp Leu Gly Glu Thr Ser
            325                 330                 335

tca gct tac ggt ggc ggt gca ccc ttg ctg tcc aac acc ttt gca gct     1652
Ser Ala Tyr Gly Gly Gly Ala Pro Leu Leu Ser Asn Thr Phe Ala Ala
        340                 345                 350

ggc ttt atg tgg ctg gat aaa ttg ggc ctg tca gcc cag atg ggc ata     1700
Gly Phe Met Trp Leu Asp Lys Leu Gly Leu Ser Ala Gln Met Gly Ile
    355                 360                 365

gaa gtc gtg atg agg cag gtg ttc ttc gga gca ggc aac tac cac tta     1748
Glu Val Val Met Arg Gln Val Phe Phe Gly Ala Gly Asn Tyr His Leu
370                 375                 380                 385

gtg gat gaa aac ttt gag cct tta cct gat tac tgg ctc tct ctt ctg     1796
Val Asp Glu Asn Phe Glu Pro Leu Pro Asp Tyr Trp Leu Ser Leu Leu
                390                 395                 400

ttc aag aaa ctg gta ggt ccc agg gtg tta ctg tca aga gtg aaa ggc     1844
Phe Lys Lys Leu Val Gly Pro Arg Val Leu Leu Ser Arg Val Lys Gly
            405                 410                 415

cca gac agg agc aaa ctc cga gtg tat ctc cac tgc act aac gtc tat     1892
Pro Asp Arg Ser Lys Leu Arg Val Tyr Leu His Cys Thr Asn Val Tyr
        420                 425                 430

cac cca cga tat cag gaa gga gat cta act ctg tat gtc ctg aac ctc     1940
His Pro Arg Tyr Gln Glu Gly Asp Leu Thr Leu Tyr Val Leu Asn Leu
    435                 440                 445

cat aat gtc acc aag cac ttg aag gta ccg cct ccg ttg ttc agg aaa     1988
His Asn Val Thr Lys His Leu Lys Val Pro Pro Pro Leu Phe Arg Lys
450                 455                 460                 465

cca gtg gat acg tac ctt ctg aag cct tcg ggg ccg gat gga tta ctt     2036
Pro Val Asp Thr Tyr Leu Leu Lys Pro Ser Gly Pro Asp Gly Leu Leu
                470                 475                 480

tcc aaa tct gtc caa ctg aac ggt caa att ctg aag atg gtg gat gag     2084
Ser Lys Ser Val Gln Leu Asn Gly Gln Ile Leu Lys Met Val Asp Glu
            485                 490                 495

cag acc ctg cca gct ttg aca gaa aaa cct ctc ccc gca gga agt gca     2132
Gln Thr Leu Pro Ala Leu Thr Glu Lys Pro Leu Pro Ala Gly Ser Ala
        500                 505                 510

cta agc ctg cct gcc ttt tcc tat ggt ttt ttt gtc ata aga aat gcc     2180
Leu Ser Leu Pro Ala Phe Ser Tyr Gly Phe Phe Val Ile Arg Asn Ala
    515                 520                 525

aaa atc gct gct tgt ata tgaaaataaa aggcatacgg tacccctgag           2228
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Lys Ile Ala Ala Cys Ile
530 535

acaaaagccg agggggtgt tattcataaa acaaaaccct agtttaggag gccacctcct 2288

tgccgagttc cagagcttcg ggagggtggg gtacacttca gtattacatt cagtgtggtg 2348

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caaagcgtga gtccctcgtt cctgtccatc accatcgacg ccagtctggc caccgaccct 180

cggttcctca ccttcctgag ctctccacgg cttcgagccc tgtctagagg cttatctcct 240

gcgtacttga gatttggcgg caccaagact gacttcctta tttttgatcc caacaacgaa 300

cccacctctg aagaaagaag ttactggcaa tctcaagaca acaatgatat ttgcgggtct 360

gaccgggtct ccgctgacgt gttga 385

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<212> DNA

<213> Rattus norvegicus

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<222> (507)..(507)

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cattaactgt caccacctgc agtggtctac ttagagaaca ccgcactgga tgttaacact 180

gaagcgcgtg ccccgccctc ccgaggctct ggatccagcg ttgaagcttg ccccgccctc 240

ccgaggctct ggatccagca ctggagcatg ccccgccctc ccgaggctct ggagcttgct 300

aaggagtccg ctccctaccg ctggggtttt gctttattct tatgaatgac acccctgacc 360

gctttcgtct caggggtact gtaatgcctt ttattttcat atacaagctg cgattttggc 420

atttcttatg acaaaaaacc cataggaaaa ggcgggcacg cttagtgagc ttcctgcggg 480

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c 541

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<212> PRT
<213> Rattus norvegicus

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Phe Tyr Thr Lys Arg Leu Phe Gln Ser Val Ser Pro Ser Phe Leu Ser
35 40 45

Ile Thr Ile Asp Ala Ser Leu Ala Thr Asp Pro Arg Phe Leu Thr Phe
50 55 60

Leu Ser Ser Pro Arg Leu Arg Ala Leu Ser Arg Gly Leu Ser Pro Ala
65 70 75 80

Tyr Leu Arg Phe Gly Gly Thr Lys Thr Asp Phe Leu Ile Phe Asp Pro
85 90 95

Asn Asn Glu Pro Thr Ser Glu Glu Arg Ser Tyr Trp Gln Ser Gln Asp
100 105 110

Asn Asn Asp Ile Cys Gly Ser Asp Arg Val Ser Ala Asp Val Leu
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<400> 49

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1 5 10 15

Leu Pro Ala Gly Ser Ser Leu Ser Val Pro Ala Phe Ser Tyr Gly Phe
20 25 30

Phe Val Ile Arg Asn Ala Lys Ile Ala Ala Cys Ile
35 40